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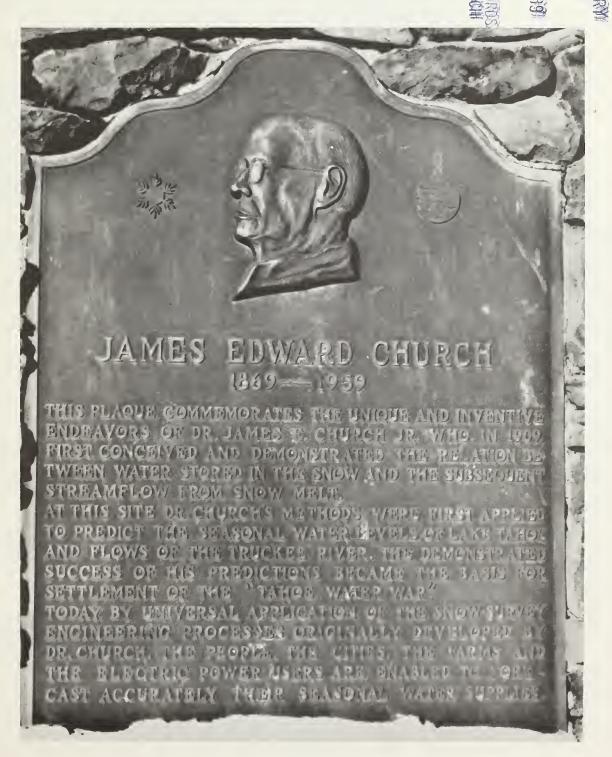
Soil Conservation Service

Spokane, Washington



Washington Water Supply Outlook

JUNE 1, 1989



Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

An error is associated with each forecast, and this error decreases as the season progresses and more data becomes available. To express the range of error that can be expected, "most probable" forecasts are issued along with a range representing a "reasonable minimum" and a "reasonable maximum". Actual streamflow can be expected to fall within this range in eight out of ten years. Additionally two specific scenarios are provided based on the assumption that subsequent precipitation will be "wet", above average, or "dry", below average.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

SIAIE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola Ave., Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Building A, 3rd floor, Denver, CO 80211
Idaho	3244 Elder Street, Room 124, Boise, ID 83705
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	W. 920 Riverside, Room 360, Spokane, WA 99201-1080
Wyoming	Federal Building, 100 "B" Street, Room 3124, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

Water supply reports published by other agencies:

California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Washington Water Supply Outlook

and

Federal — State — Private Cooperative Snow Surveys

Issued by

Wilson Scaling Chief Soil Conservation Service Washington, D.C.

Released by

Lynn A. Brown State Conservationist Soil Conservation Service Spokane, Washington

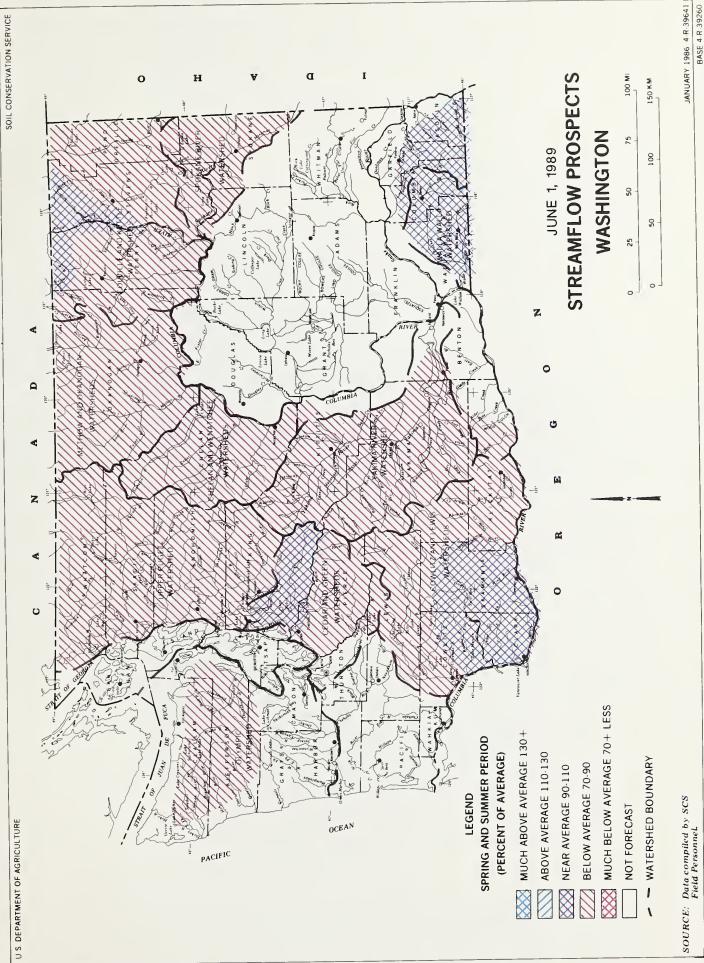
Prepared by

William F. Weller Water Supply Specialist Room 360 U.S. Courthouse Spokane, Washington 99201

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TABLE OF CONTENTS

STATE STREAMFLOW PROSPECTS MAP	1
STATE GENERAL OUTLOOK	2
BASIN OUTLOOK AND CONDITIONS	
SPOKANE	4
COLVILLE AND PEND OREILLE	6
OKANOGAN AND METHOW	8
WENATCHEE AND CHELAN	10
YAKIMA	12
WALLA WALLA	14
COWLITZ AND LEWIS	16
WHITE - GREEN	18
NORTH PUGET SOUND	20
OLYMPIC	22
SNOW DATA	24



GENERAL OUTLOOK

SUMMARY:

NORMAL SPRING WEATHER COVERED WASHINGTON DURING MAY CAUSING A SLOWDOWN IN THE MELTOUT OF THE SNOWPACK. SNOWPACK VARIED OVER THE STATE FROM 121% IN THE LEWIS TO 54% IN THE PEND OREILLE. RESERVOIR STORAGE IMPROVED AT MAJOR IRRIGATION PROJECTS THROUGHOUT THE STATE, WITH THE RESERVOIRS IN THE YAKIMA BASIN 103% OF NORMAL. JUNE 1 FORECASTS FOR 1989 RUNOFF VARY FROM 100% ON THE LEWIS RIVER TO 74% ON THE NACHES. MAY STREAMFLOWS WERE NEAR NORMAL AND VARIED FROM 131% ON THE WALLA WALLA RIVER TO 71% ON THE YAKIMA RIVER AT KIONA. PRECIPITATION WAS NEAR NORMAL IN WESTERN WASHINGTON, BUT ABOVE AVERAGE IN EASTERN WASHINGTON. TEMPERATURES WERE NEAR NORMAL DURING MAY AND VARIED FROM TWO DEGREES ABOVE IN THE OKANOGAN TO ONE DEGREE BELOW IN THE COLVILLE BASIN. NOTE: THE TERMS "NORMAL" AND "AVERAGE" AS USED IN THIS PUBLICATION, ARE THE SAME.

SNOWPACK:

Meltout is nearly complete at elevations below 5000 feet. SNOTEL sites in Washington are showing snowpack near average for June 1, at 106%. Seventeen of the 36 SNOTEL sites are bare of snow, compared to 21 last year. Peak water content at most SNOTEL sites occurred on April 6. The Cowlitz-Lewis Basin at 121% of average was the highest snowpack. Other basins along west slopes of the Cascade Mountains include the Skagit with 75% and the White-Green Basin 100%. The eastern slopes of the Cascade Mountains are lower, with the Yakima Basin at 84% of normal. Maximum snow cover is at the Paradise SNOTEL with 70.7 inches of water content on the ground. This site has normally had 49.3 inches of water content.

PRECIPITATION:

Precipitation was above normal over most of Washington for May with only the Olympic Basin, at 70%, coming in below average. The Okanogan-Methow at 214%, and Walla Walla at 180%, were the highest basins. The water-year precipitation is normal over the state and varies from 88% on the Olympic to 109% on the White-Green Basin. Statewide, the precipitation from NOAA stations is 97% of average. SNOTEL sites in Washington showed the high elevation year-to-date precipitation values to be 95% of normal, up from 86% last month.

RESERVOIRS:

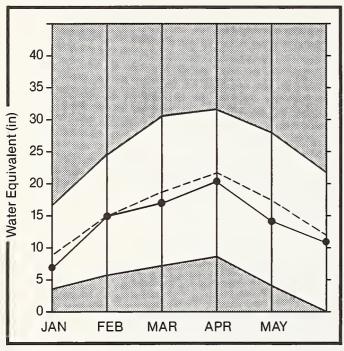
Major reservoir storages include Roosevelt at 65% of normal, down from 124% last month. Banks Lake is at 165% and the Okanogan reservoirs contained 108% of June 1 average. Cool weather and rain continued to improve the reservoir outlook throughout the state. June 1 reservoir storage in the Yakima Basin was 957,900 acre feet, 103% of average, up from 854,600 acre feet, last month. The power reservoirs contain the following: Coeur d'Alene Lake, 278,200 acre feet or 79% of normal, Chelan Lake, 424,000 acre feet at 94% of average and 63% of capacity, and the Skagit River reservoirs at 1,106,700 acre feet, 98% of average.

STREAMFLOW:

May 1 streamflow forecasts vary from 100% in the Lewis River to 76% for the Yakima River near Parker. Forecasts for some west side streams include: Cedar River, 93% down from 100% last month, Skagit River, 81% down from 83%, and the Dungeness River, 88%. Some east side streams include the Methow River, 85% and the Chelan River 84%, down from 95% last month. May streamflows were near normal in most areas of Washington, with the Walla Walla River at 131% the highest. Streamflow on the Yakima River at Kiona was 71% of average and the Spokane River was 80%. Flows in the Columbia River at the international border were 94% and at the Dalles 92%.

SPOKANE

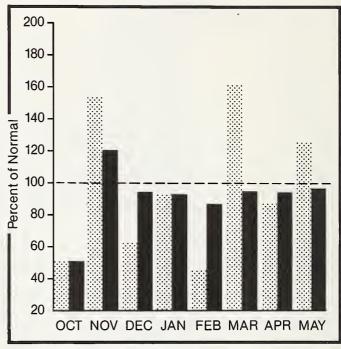
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation Year to date precipitation

SPOKANE RIVER BASIN

OUTLOOK:

WATER SUPPLY June 1 storage in Coeur d' Alene Lake was 278,200 acre feet; average storage in Coeur d'Alene for June 1 is 326,900 acre feet. Streamflow on the Spokane River was 80% of normal for May. Forecasted runoff for the Spokane River Basin is 87% of normal for June This forecast is based on a snowpack 54% of average and a water year-to-date precipitation value 96% of normal. Precipitation for May was 125% of average. Maximum snow water again occurred at the Lost Lake snow course with 79 inches of snow and 37.5 inches of water content, June 1 average for this site is 44.7 inches. Temperatures averaged one degrees below normal during May.

SPOKANE RIVER BASIN

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
SPOKANE or Post Falls (2)	MAY-SEP	1700	87	1760	1680	2130	1190	1957
	AAY-JUL	1600	86	1640	1540	2030	1140	1859
SPOKANE at Long Lake	MAY-JUL	1800	86			2240	1360	2097
RESER	 VOIR STORAGE		1000AF)	 	WATE	RSHED SNOWPA	CK ANALYSIS	
	USEABLE 1		ABLE STORAGE					YEAR AS % O
RESERVOIR	CAPACITYI I	THIS YEAR	LAST YEAR A	VG. 1	RSHED	COL AVE	IRSES S'D LAST	YR. AVERAGE
COEUR D'ALENE	291.2	278.2	282.2 35	3.9 l Spok	ane River		187	88

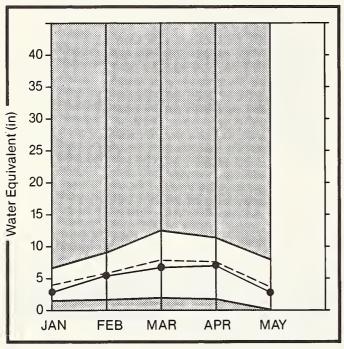
WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively. REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.

(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.

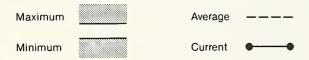
(2) - Corrected for upstream diversions or changes in reservoir storage.

COLVILLE - PEND OREILLE

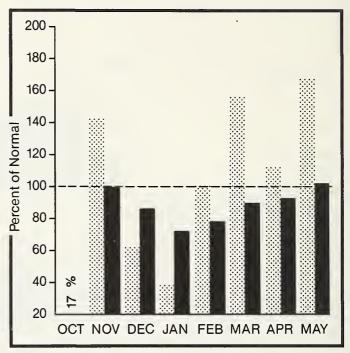
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations



COLVILLE - PEND OREILLE RIVER BASINS

WATER SUPPLY OUTLOOK:

The forecast for the Pend Oreille River streamflow is 82% of normal for the summer. Other forecasts are the Kettle River, 90% and the Colville River at 89% of normal for the summer runoff period. Precipitation during May was 167% of average, bringing the water year-to-date to 101% of normal. June 1 snow cover basin-wide is 54% of average, down from 76% last month. May 1 streamflow was 93% of normal on the Pend Oreille River and 78% on the Kettle. Snowpack at Bunchgrass Meadow SNOTEL site was 7.5 inches of water. Temperatures averaged one degrees below normal for May.

COLVILLE - PEND OREILLE RIVER BASINS

STREAMFLOW FORECASTS

		011121	IN LOW TOWER	.5.4				
FORECAST POINT	FORECAST PERIOD		MOST PROBABLE (% AVG.)	WET SUBS (1000A		FEAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR, AVG. (1000AF
END OREILLE bl Box Canvon (2)	MAY-SEP	10700	82			14000	7560	13100
	MAY-JUL	9710	82			12700	6750	11840
	ипс-лем	8100	82			10600	5630	9879
HAMOKANE CK or Long Lake	MAY-AUG	7.8	85			11.2	4.5	9.2
annown E or in Long Lone	JUL-AUG	3.1	86			4.5	1.7	3,6
OLVILLE at Kettle Falls	MAY-SEP	79	89	8		112	45	89
	MAY-JUL	69	88	7		98	39	78
	MUL-YAM	60	88	6	5 59	84	34	68
ETTLE or Laurier	MAY-SEP	1480	90			1730	1150	1644
ELLEE III CONTEL	MAY-JUL	1390	90			1610	1170	1545
	MUL-YAM	1220	90			1420	1030	1362
	tiirt ook					1120	1000	1502
OLUMBIA at Birchbank (2)	MAY-SEP	39900	96			46500	32800	41540
	MAY-JUL	31100	95			36600	25900	32600
	MUL-YAM	21700	95			25600	18100	22800
OLUMBIA at Grand Coulee Dam (2)	WAY EED	56200	94			/0000	E0000	E07 0.0
OCCUPIA St Grand Coulee Dam (2)	MAY-SEP MAY-JUL	46100				62200	50200	59780 49060
	MAY-JUL MUL-YAM	34600	94 94			50500 37500	41700 31300	36760
		34600					31300	30/00
RESERVOIR	STORAGE	(1000AF)	1 1 1	ТАН	ERSHED SNOW	PACK ANALYS	IS
	USEABLE 1		BLE STORAGE					IS YEAR AS % O
RESERVOIR	CAPACITYI 1	YEAR	LAST YEAR A	H I AVG₊ I	ATERSHED		DURSES JG'D LA	ST YR. AVERAG
:00SEVELT	5232.0	200,000,000,000,000,000	3642.2 28	51.0 C	olville River		0	0 0
ANKS	715.0	645.4	672.2 41	18.0 P	end Oreille Riv		7 13	6 52
PHILLS	71310	प्रमुख्य	0, 242 41	1	ena nieitte kiv	C1	4	H 46
				i K	ettle River		0	0 0
		30	ALCOHOLO IN	1				

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.

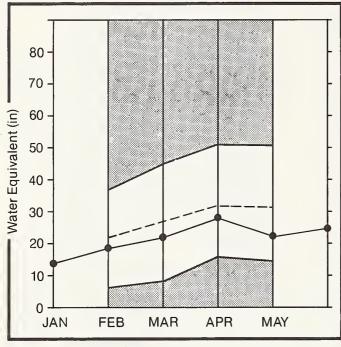
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(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.

(2) - Corrected for upstream diversions or changes in reservoir storage.

OKANOGAN AND METHOW

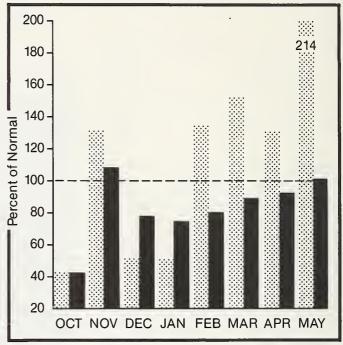
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

OKANOGAN - METHOW RIVER BASINS

WATER SUPPLY OUTLOOK:

May precipitation in the Okanogan-Methow was 214% of normal, with water year-to-date 101% of average. Snow cover, as of June 1, is 82% of average on the Temperatures were two degrees Okanogan-Methow Basin. Maximum snow water above normal for the month. occurred at the Harts Pass SNOTEL, elevation 6500 feet, with 29.1 inches of water content in the pack. Storage in the Conconully Reservoirs is 19,500 acre feet, which is 83% of capacity and 108% of June 1 average. May streamflow on the Methow River was 86% of normal, 93% on the Okanogan River and 97% on the Summer runoff forecasted for the Similkameen. Okanogan River is 80% of normal. The Similkameen River 80% and the Methow River is 85% of normal.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOO	MOST PROBABLE (1000AF)		WET SUBS. (1000AF)	ORY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
SIMILKAMEEN R. or Nighthawk	MAY-SEP	1070	80	1190	960	1340	800	1345
	MAY-JUL	980	79	1100	895	1230	730	1246
	MUL-YAM	835	80	920	740	1040	625	1042
OKANOGAN R. or Tonasket	MAY-SEP	1220	80	1330	1070	1460	975	1527
	MAY-JUL	1090	80	1200	965	1310	870	1367
	MUL-YAM	900	80	990	790	1080	720	1123
METHOW RIVER or Pateros	MAY-SEP	765	85	855	655	980	550	898
	MAY-JUL	700	85	780	610	900	500	824
		585	85	655	505	750	420	
RESER	RVOIR STORAGE	(1000AF)		WAT	ERSHEO SNOWPA	ACK ANALYSIS	
	USEABLE I		ELE STORAGE					YEAR AS % OF
RESERVOIR	CAPACITY		LAST		RSHEO		JRSES	VD AMEDAGE
		YEAR	YEAR A	VG. 1		HVU	'O LAST	YR. AVERAG
CONCONULLY LAKE (SALMON)	10.5	9.6	8.7	9.0 Ok.ar	ogan River	1	171	82
		Phys. 17	erice of the Control of the					

WET SUBS, and ORY SUBS, represent 150 and 50 percent subsequent precipitation events respectively.

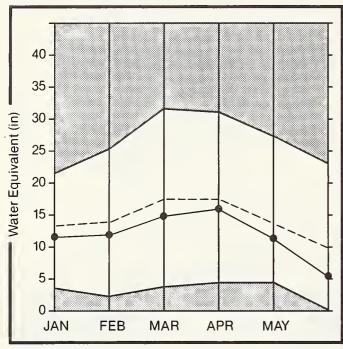
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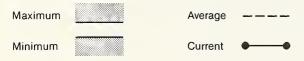
^{(2) -} Corrected for upstream diversions or changes in reservoir storage.

WENATCHEE AND CHELAN

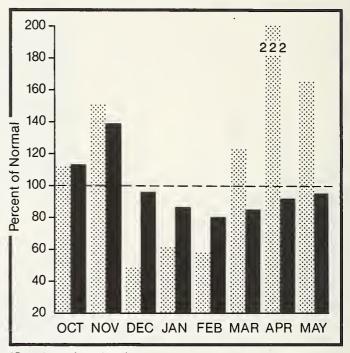
Mountain snowpack* (inches)



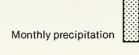
*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations



Year to date precipitation

WENATCHEE AND CHELAN RIVER BASINS

WATER SUPPLY OUTLOOK:

Precipitation during May was 164% of normal in the basin and 94% from October 1 to June 1. Reservoir storage in Lake Chelan is 424,000 acre feet or 94% of June 1 average and 63% of capacity. Snowpack in the Wenatchee basin is 41% of normal and in the Chelan Basin 71% of normal. Miners Ridge SNOTEL had the most snow water with 39.3 inches on June 1. Runoff for the Wenatchee River is forecast to be 87% of normal for the summer. Forecasts for the Chelan River runoff are 84%. Streamflow for May on the Wenatchee River was 89% of normal and 101% on the Chelan River.

WENATCHEE - CHELAN PIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS, (1000AF)	DRY SUBS, (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
CHELAN RIVER at Chelan 1	MAY-SEP	905	84	935	840	1060	755	1075
	MAY-JUL	790	85	820	735	920	660	931
	NUL-YAM	600	85	615	560	700	500	707
STEHEKIN R. at Stehekin	MAY-SEP	700	90	725	675	780	625	775
	JUL-YAM	580	90	585	565	645	515	645
	MUL-YAM	425	90	450	405	470	380	473
ENTIAT RIVER or Ardenvoir	MAY-SEP	191	88	210	169	220	163	217
	MAY-JUL	172	88	188	153	199	145	195
	MUL-YAM	138	89	152	123	160	116	155
WENATCHEE R. at Peshastin	MAY-SEP	1290	87	1470	1110	1780	800	1489
	MAY-JUL	1160	87	1310	985	1600	720	1327
	MUL-YAM	895	87	1020	760	1230	555	1027
STEMILT or Wenatchee (miners in)	MAY-SEP	122	88	125	116	168	76	138
ICICLE CREEK or Leavenworth	APR-SEP	330	89	335	320	450	210	370
	APR-JUL	300	88	305	295	410	188	340
	APR-JUN	240	89	245	235	330	151	270
COLUMBIA R. bl Rock Island Dam 2	MAY-SEP	61500	95			68700	54300	65060
	MAY-JUL	50900	95			56800	45000	53860
	MUL-YAM	38500	95			43000	34000	40550
RESERVOI	R STORAGE		(1000AF)	 	TAW	ERSHED SNOWPA	ack analysis	

	RESERVOIR STORAGE	(1000AF)	I WATERSHED S	NOWPACK ANA	ALYSIS	
RESERVOIR	USEABLE I CAPACITYI I	** USEABLE STORAGE ** THIS LAST YEAR YEAR AVG,	 WATERSHED 	NO↓ COURSES AVG'D	THIS YEAR	
CHELAN LAKE	676,1	424.0 485.1 450.6	Chelan Lake Basin	3	87	71
			Entiat River	0	0	0
			Wenatchee River	4	59	36
			Colockum Creek	0	0	0
			Squilchuck Creek	0.0	ø	٥
			Stemilt Creek	0	0	0
			1			

WET SUBS, and DRY SUBS, represent 150 and 50 percent subsequent precipitation events respectively.

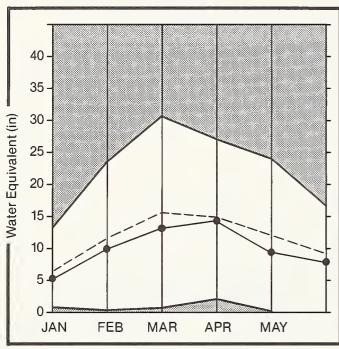
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YAKIMA

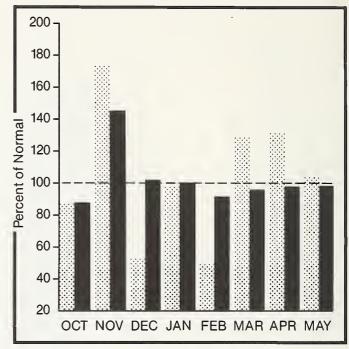
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Irrigation water will be adequate for the summer with YAKIMA RIVER BASINJune 1 reservoir storage for the five major

WATER SUPPLY OUTLOOK:

reservoirs at 957,900 acre feet or 103% of normal, up from 854,600 acre feet last month. Forecasts for the Yakima Basin runoff vary throughout the basin as the Yakima River at Cle Elum, 80%, Naches follows: River, 74%, the Yakima River at Parker, 78% and Ahtanum Creek 90%. May streamflow on the Yakima River at Martin was 89% of normal and 85% on the Snowpack is 84% of average in the Naches River. Yakima Basin based upon 10 snow course and SNOTEL May precipitation was 102% of normal and readings. Temperatures were 98% for the water year-to-date. one degree below the May average. Volume forecasts for the Yakima Basin are for natural flow. they may differ from the U. S. Bureau of Reclamation's forecast for the total water supply available which includes adjustments for reservoir operation and irrigation return flow.

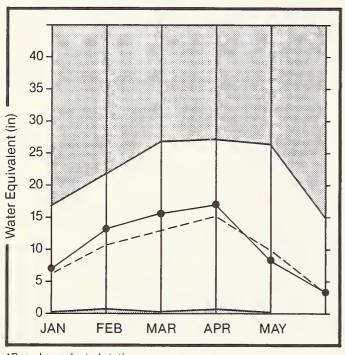
STREAMFLOW FORECASTS

FORECAST FOINT	FORECAST	MOST PROBABLE	MOST PROBABLE	,	WET SUBS.	DRY SUBS.	REAS. MAX.	REAS. MIN.	25 YR. AVG.
	PERIOD	(1000AF)	(% AVG.)	(1)	000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)
		1							
AKIMA RIVER at Martin 1	MAY-SEP MAY-JUL	91 83	83 83		94 87	88 80	104 95	78 71	109 100
	MUL-YAM	71	8		74	68	81	61	85
AKIMA RIVER at Cle Elum 2	MAY-SEP	630	80		670	575	730	530	786
	MAY-JUL MAY-JUL	545 455	80 80		580 490	505 420	635 530	455 380	682 570
AKIMA RIVER or Parker 2	MAY-SEF	1310			1430	1230	1630	990	1682
	MAY-JUL YAY-JUL	1150 975	79 78		1240 1050	1060 900	1430 1210	870 740	1469 1250
ACHESS RIVER or Easton 1	MAY-SEP	84	78		86	82	98	70	108
	MAY-JUL	69	78		73	66	81	57	89
	MUL-YAM	59	77		64	56	69	49	77
LE ELUM RIVER or Roslvo 1	MAY-SEP	330	84		355	320	375	285	393
	JUL-YAM VUL-YAM	300 245	85 85		320 260	285 235	340 280	260 210	353 289
UMFING RIVER or Nile 1	MAY-SEP	105	85		110	100	122	88	123
on the naven in that a	MAY-JUL	95	85		99	92	111	79	112
	MUL-YAM	76	84		80	73	89	63	90
MERICAN RIVER or Nile	MAY-SEP	93	87		96	90	106	80	107
	MAY-JUL MUL-YAM	84 69	87 87		88 71	81 66	96 78	72 60	97 79
IETON RIVER at Tieton 1	MAY-SEP	185	87		196	176	220	151	213
TETOK KEVEN GO TEGOM I	MAY-JUL	154	87		163	145	182	126	177
	MUL-YAM	118	87		125	113	140	96	136
ACHES RIVER on Naches 2	MAY-SEP	610	84		645	580	705	515	726
	MAY-JUL	540	84		580	520	625	455	645
	MUL-YAM	445	83		475	430	515	375	533
HTANUM CREEK or Tampico Z	MAY-SEP	35			37	33	44	26 23	39 35
	MUL-YAM MUL-YAM	31 26	89 90		33 28	30 24	39 32	19.6	35 29
		3							
RESER	VOIR STORAGE	(1000AF)	1		WATE	ERSHED SNOWPA	nCK ANALYSIS	
	WOEAGLE L							TUTO	
FESERVOIR	CAPACITY		BLE STORAL LAST	6E ## }	WATE	RSHED	COT NO *	JRSES	YEAR AS % OF
		YEAR	YEAR	AVG. I			AVG		YR. AVERAGE
EECHELUS	157.3	144,4	125.3	144.0 1		ma Miver	200.00	135	93
CACHESS	239.0	190.8	149.6	218.0	Anta	อกบุล Creek	1	. 0	1900
LE ELUM	436.9	407.1	331.3	378.0					
UMPING LAKE	33.7	28,6	32.5	27.0					
RIMROCK	198.0	187.0	175.8	167.0					
			0.000				200		

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively. REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.
(2) - Corrected for upstream diversions or changes in reservoir storage.

WALLA WALLA

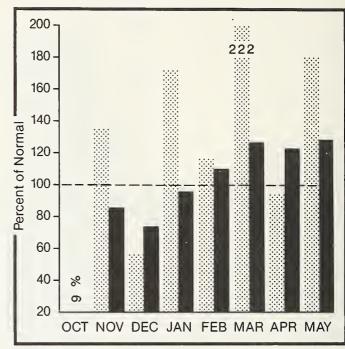
Mountain snowpack* (inches)



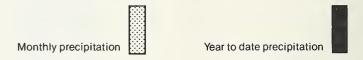
*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations



WALLA WALLA RIVER BASIN

WATER SUPPLY OUTLOOK:

May precipitation was 180% of average bringing the water year-to-date precipitation to 127% of normal. June 1 snowpack in the Walla Walla River Basin is 100% of normal. Water content at the Touchet SNOTEL site was 2.3 inches on June 1, down from 30.6 inches last month. The forecast is for 100% of average streamflow in the Walla Walla River for the coming summer. May streamflow was 131% of normal on the Walla Walla River and 148% on the Snake River. Temperatures were one degree above average for May.

WALLA WALLA RIVER BASIN

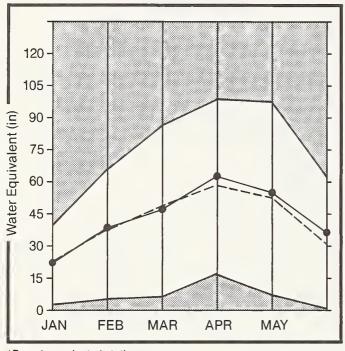
STREAMFLOW FORECASTS

FORECAST POINT	FORECAST	MOST PROBABLE	MOST PROBABLE	₩ET SUBS,	DRY SUBS:	REAS. MAX.	REAS.	25 YR. AVG.
	PERIOD	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	(1000AF)	(1000AF)	(1000AF)
MILL CREEK at Walla Walla	MAY-SEP	7.7	100	8.1	7.3	10.6	4.8	7.7
	MAY-JUL	7.5	100	7.9	7 + 1	10.4	4.6	7.5
	MUL-YAM	7.4	101	7 +6	7+0	10.2	4.6	7.3
SF WALLA WALLA or MiltonFreewater	MAY-JUL	39	100	40	38	47	31	39
COUSE CK or Milton Freewater	MAY-JUL	1.5	94	1.6	1.4	2.0	1.0	1.6
PINE CREEK near Weston	MAY-JUL	0.8	100	0.8	0.7	1.0	0.6	0.8
COLUMBIA R. at The Dalles 2	MAY-SEF	78100	88			89600	66600	88790
	MAY-JUL	65200	88			74800	55600	74070
	MUL-YAM	50500	88			58000	43000	57430
RESERVOI	R STORAGE		(1000AF)	1 1 1	тан	ERSHED SNOWPA	CK ANALYSIS	
	USEABLE I	 ** USE/	ABLE STORAGE	жж		 • ОИ	THIS	YEAR AS % OF
RESERVOIR	CAPACITY		LAST	I WATE	RSHED	COL	JRSES	
		YEAR	YEAR A	AVG. I		AVG	D LAST	YR. AVERAGE
				Mill	. Creek		٥	O

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively. REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.
(2) - Corrected for upstream diversions or changes in reservoir storage.

COWLITZ AND LEWIS

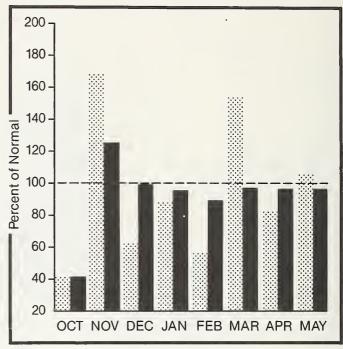
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations



COWLITZ - LEWIS RIVER BASINS

WATER SUPPLY OUTLOOK:

June 1 snow cover for the Cowlitz-Lewis Basin is 121% of normal, up from 105% last month. The Paradise Park SNOTEL has the maximum water content for the basin with 70.7 inches of water. Summer runoff forecasts for the Lewis River are 100% and for the Cowlitz River, 88%,. May precipitation was 105% of normal bringing the water year-to-date precipitation to 96% of average. Temperatures were one degree above normal for May.

COWLITZ - LEWIS RIVER BASINS

STREAMFLOW FORECASTS HET 25 YR. FORECAST MOST MOST DRY REAS. REAS. PROBABLE PROBABLE SUBS. SUBS. MAX. MIN. FORECAST POINT AVG. PERIOD (1000AF) (% AVG.) (1000AF) (1000AF) (1000AF) (1000AF) (1000AF) 100 LEWIS RIVER at Ariel 2 MAY-SEF 895 975 815 1110 680 892 MAY-JUL 730 100 805 665 905 555 732 MUL-YAM 605 100 660 550 750 460 606 1410 1790 1040 2200 625 COWLITZ R. bl Mavfield Dam 2 MAY-SEF 1604 865 710 MAY-JUL 1190 88 1500 1850 530 1350 MUL-YAM 960 88 1210 1500 425 1092 COWLITZ R. at Castle Rock 2 MAY-SEF 1720 2250 1210 2720 715 2050 1430 MAY-JUL 84 1870 1000 2270 595 1706 **MUL-YAM** 1160 1520 800 1840 485 1378 RESERVOIR STORAGE (1000AF) WATERSHED SNOWPACK ANALYSIS

WET SUBS, and DRY SUBS, represent 150 and 50 percent subsequent precipitation events respectively, REAS, MAX, and REAS, MIN, forecasts are for 10% and 90% exceedance levels with the exception of (1) below, (1) - REAS, MAX, and REAS, MIN, forecasts are for 5% and 95% exceedance levels.

USEABLE | ** USEABLE STORAGE ** |

CAFACITY! THIS

I YEAR

LAST

YEAR

AVG. I

Cowlitz River

Lewis River

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COURSES

AVG'D

3

THIS YEAR AS % OF

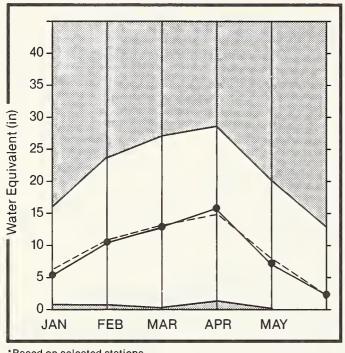
LAST YR. AVERAGE

1900

^{(2) -} Corrected for upstream diversions or changes in reservoir storage.

WHITE - GREEN

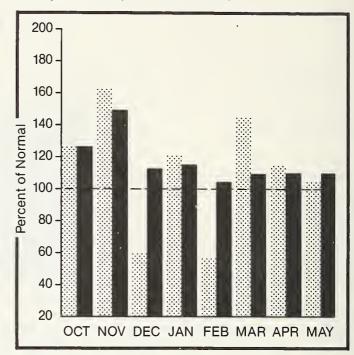
Mountain snowpack* (inches)



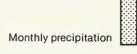
*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations



Year to date precipitation

WHITE - GREEN RIVER BASINS

WATER SUPPLY OUTLOOK:

Summer runoff is forecasted to be 88% on the Green River, and 93% of normal on the Cedar River. June 1 snowpack is 100% of normal for the basin. May precipitation was 103% of normal, bringing the water year-to-date to 109% of average. Water content on June 1 at the Morse Lake SNOTEL was 29.4 inches. Temperatures were one degree above average for May.

WHITE - GREEN RIVER BASINS

STREAMFLOW FORECASTS MOST MOST WET DRY 25 YR. REAS. REAS. FORECAST PROBABLE PROBABLE SUBS. FORECAST POINT SUBS. MAX. MIN. AVG. PERIOD (1000AF) (% AVG.) (1000AF) (1000AF) (1000AF) (1000AF) (1000AF) GREEN RIVER bl Howard Hanson Dam 2 MAY-SEP 182 205 165 215 151 207 MAY-JUL 88 174 140 156 184 177 124 150 MUL-YAM 135 121 158 111 153 CEDAR RIVER or Cedar Falls MAY-SEP 75 62 82 56 74 MAY-JUL 66 55 72 50 MUL-YAM 60 45 59 41 54 RESERVOIR STORAGE (1000AF) WATERSHED SNOWPACK ANALYSIS USEABLE | ** USEABLE STORAGE ** | THIS YEAR AS % OF ΝО. RESERVOIR CAPACITY! THIS LAST WATERSHED COURSES 1 YEAR YEAR: AVG. 1 AVG'D LAST YR. AVERAGE White River Green River 0

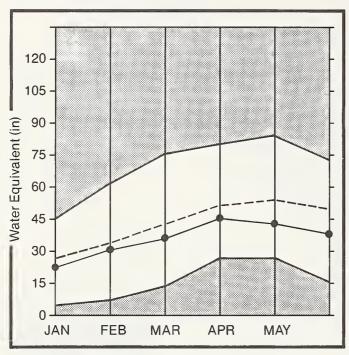
Cedar River

WET SUBS, and DRY SUBS, represent 150 and 50 percent subsequent precipitation events respectively. REAS, MAX, and REAS, MIN, forecasts are for 10% and 90% exceedance levels with the exception of (1) below. (1) - REAS, MAX, and REAS, MIN, forecasts are for 5% and 95% exceedance levels.

^{(2) -} Corrected for upstream diversions or changes in reservoir storage.

NORTH PUGET SOUND

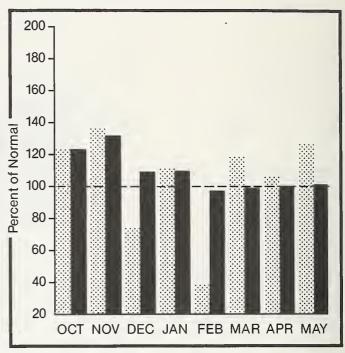
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations



NORTH PUGET SOUND RIVER BASIN

WATER SUPPLY OUTLOOK:

Runoff for the Skagit River is forecasted to be 81% of normal. June 1 Reservoir storage was average, with Ross Lake at 98% of normal and 72% of capacity. Snow cover for June 1 in the basin is 75% of normal, with Miners Ridge SNOTEL at 6200 feet, having 39.3 inches of water content. Precipitation values for May were 126% of average with a water year-to-date at 101% of normal. May temperatures were one degree above average.

NORTH PUGET SOUND RIVER BASINS

STREAMFLOW FORECASTS

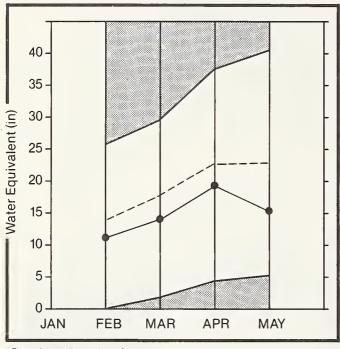
FORECAST FOINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUES. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF		25 YR. AVG. (1000AF)
SKAGIT RIVER at Newhalem 2	MAY-SEF MAY-AUG MAY-JUL MAY-JUN	1660 1550 1380 1230	81 81 82 83	1870 1740 1530 1350	1470 1380 1210 1070	1950 1820 1620 1440	1370 1280 1140 1020		2062 1919 1689 1485
RESERV	OIR STORAGE	(1000AF)	 	WATE	RSHED SNOWFA	CK ANALY	SIS	
RESERVOIR	USEABLE CAFACITY!		BLE STORAGE X LAST YEAR AV		RSHED	 ООИ ООУА	RSES -		EAR AS % OF
 ROSS	1404.1	1012.5	973.1 1033	1	it River	3		96	75
DIABLO RESERVOIR	90.6	86.4	86.7 88	3.1 Bake	r River	9		98	7.8
GORGE RESERVOIR	9.8	7.8	7,9	l Church	walmie River omish River	1		18 42	93 5

WET SUBS, and DRY SUBS, represent 150 and 50 percent subsequent precipitation events respectively. REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below. (1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.

^{(2) -} Corrected for upstream diversions or changes in reservoir storage.

OLYMPIC

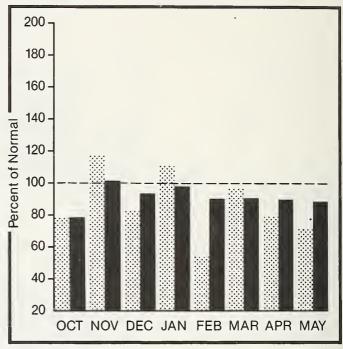
Mountain snowpack* (inches)



*Based on selected stations



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

OLYMPIC PENINSULA RIVER BASIN

WATER SUPPLY **OUTLOOK:**

May precipitation was 70% of average, with the Quillayute Weather Service station recording 3.31 inches of precipitation during the month. this is the fourth month in a row of subnormal rainfall. water year-to-date precipitation accumulation is 88% There were no snow measurements made this of normal. month in the Olympic basins. Forecasts of runoff for streamflow in the basin are for 85% of average on the Dungeness River and 82% for the Elwah River. Temperatures were one degree above normal for May.

OLYMPIC PENINSULA RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)		WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
DUNGENESS RIVER or Sequim	PER-YAM PUL-YAM WUL-YAM	116 93 82	85 85 85	123 97 87	111 88 78	139 112 98	93 74 66	137 109 97
ELWHA RIVER or Port Angeles	MAY-SEP MAY-JUL	370 300	82 83	400 320	340 275	445 360	295 240	451 363
RESERV	OIR STORAGE	(1000AF)	 	ITAW	ERSHED SNOWPA	CK ANALYSIS	
RESERVOIR	USEABLE I CAPACITYI I	** USEA THIS YEAR	ABLE STORAGE LAST YEAR		ERSHED	000 COU AVG	RSES	YEAR AS % OF
		- 		 Mors	geness River se Creek na River	0	A. A.	0

WET SUBS, and DRY SUBS, represent 150 and 50 percent subsequent precipitation events respectively. REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.

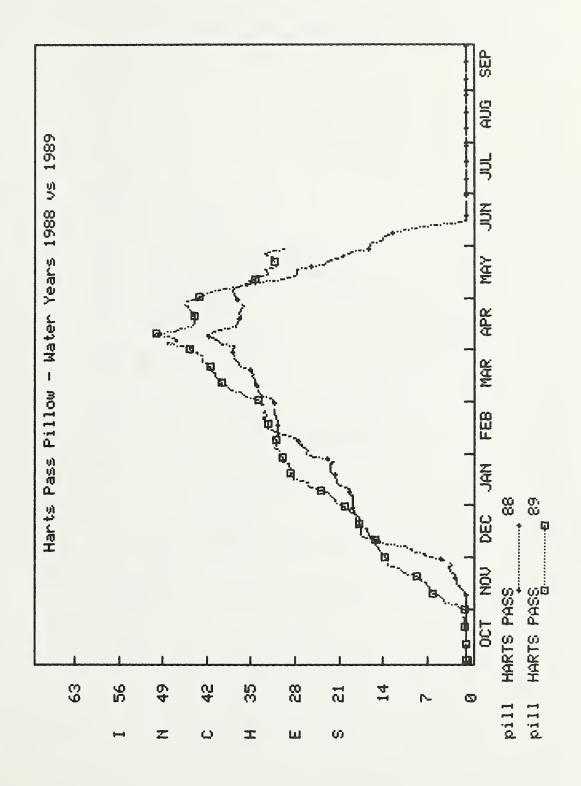
(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.

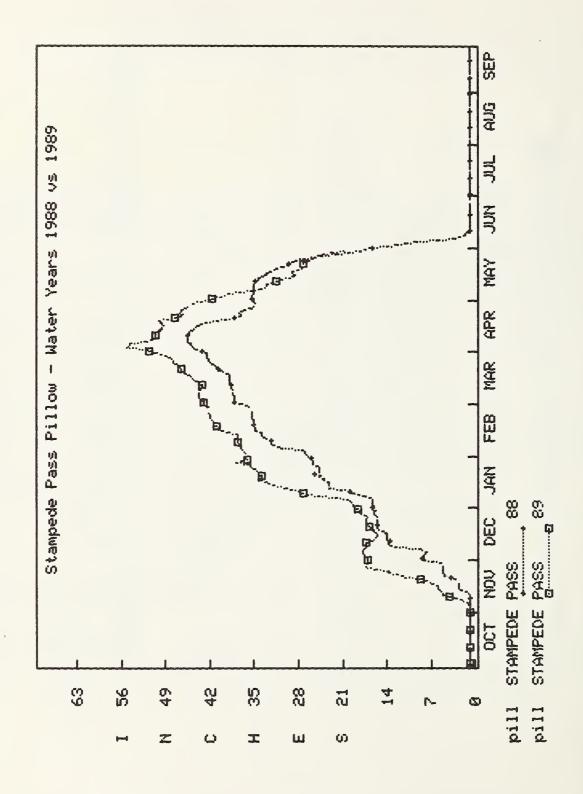
(2) - Corrected for upstream diversions or changes in reservoir storage.

BASIN SUMMARY OF SNOW COURSE DATA

JUNE 1989

SNOW COURSE	ELEVATION	OATE	SNOW OEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER	LAST YEAR	AVERAGE 1961-85
PEND OREILLE RIVER							YAKIMA RIVER						
BUNCHGRASS MDWPILLO	w 5000	6/01/89		7.5	.7	17.2	BLEWETT PASS#2PIL	LOW 4270	6/01/89		.0	.0	.0
HEART LAKE TRAIL	4800	5/26/89	0	.0	.0	2.7	BUMPING LAKE	3450	6/01/89	0	.0		
HOOOOO BASIN	6050	5/26/89	46	22.4	22.6	35.0	BUMPING LAKE (NEW	3400	6/01/89	0	.0		
HOOOOO CREEK	5900	5/26/89	44	20.7	20.8	34.7	CORRAL PASS PILI		6/01/89		26.98	28.1	24.9.
LOOKOUT	5140	5/30/B9	6	3.6	.0	12.1	FISH LAKE PILE		6/01/89		3.98	4.8	.0
SCHWEITZER BOWL	4800	5/31/89	0	.0	.0	2,4	GREEN LAKE PILI		6/01/89		5.7S	. 3	.0
SCHWEITZER RIDGE	6200	5/31/89	30	16.2	7.5	30.0	GROUSE CAMP PILI		6/01/89		.0s	.0	.0
							MORSE LAKE PILI		6/01/89		29.45	11.3	31.2
KETTLE RIVER							OLALLIE E.S. PILL STAMPEDE PASS PILI		6/01/89		37.5s	31.8	40.3
		5 (20 (00		5.3		8.9	SASSE RIDGE PILI		6/01/89 6/01/89		20.15		30.6
BIG WHITE MTN CAN		5/30/89	13	.0		.3	TUNNEL AVENUE	2450			.0s	.0	23.0
FARRON CAN	4000	5/31/89	v	.0		• •	WHITE PASS ES PILL		6/01/89 6/01/89		.0 .0s	.0	15.2
SPOKANE RIVER									5, 51, 53			.,	13,2
LOOKOUT	5140	5 (30 (00	,	3.6	•	12.1	AHTANUM CREEK						
LOST LAKE	6110	5/30/89	6 79	3.6 37.5	.0 23.1	44.7	GREEN LAKE PILL	OW 6000	6/01/89		5.75	.3	.0
MOSOUITO RIDGE	5200	5/26/89 6/01/89		11.5E	23.1	1.3		0000	0,01,03		3.73		.0
SUNSET	5540	6/01/89		18.3E	10.5	18.1	MILL CREEK						
NEWMAN LAKE							HIGH RIDGE PILL	OW 4980	6/01/89		.os	. 1	.0
							TOUCHET #2 PILL	OW 5530	6/01/89		2.3		
QUARTZ PEAK PILLO	W 4700	6/01/89		•0	.0		LEWIS AND COWLITZ RIVE	RS					
OKANOGAN RIVER							JUNE LAKE PILL		c /01 /00				
BLACKWALL PEAK CAN	6370	5/29/89	44	22.2		26.2	LONE PINE PILL		6/01/89 6/01/89		.0S 10.0S	1.0	.0 18.2
ENDERBY CAN		5/31/89	74	38.2		39.0	POTATO HILL PILL		6/01/89		.05	1.6	
GREYBACK RES CAN		5/25/89	4	.6		.8	SHEEP CANYON PILL		6/01/89		29.05	2.6	20.0
HARTS PASS PILLO		6/01/89		29 . 1 S	17.0	35.7	SPENCER MDW PILL		6/01/89		.05	.0	20.0
LOST HORSE MIN CAN		5/31/89	3	1.1		4.0	SPIRIT LAKE PILL		6/01/89		.0s	.0	.0
MISSION CREEK CAN		5/30/89	38	15.4		13.6	STRAWBERRY L. PILL		6/01/89		35.7S	30.8	18.2
MT. KOBAU CAN		5/28/89	17	5.1		5.0	SURPRISE LKS PILL	OW 4250	6/01/89		29.05		27.8
SALMON MDWS PILLO		6/01/89		.0s	.0		WHITE PASS ES PILL	OW 4500	6/01/89		.05	.3	15.2
SILVER STAR MTN CAN		5/28/89	37	18.1		16.9							
WHITE ROCKS MIN CAN		6/01/89	0	.0	`	9.3	WHITE RIVER						
ETHOW RIVER							CORRAL PASS PILL		6/01/89		26.95	28.1	24.9
							MORSE LAKE PILL	OW 5400	6/01/89		29.45	11.3	31.2
HARTS PASS PILLO SALMON MDWS PILLO		6/01/89 6/01/89		29.15 .0s	17.0 .0	35.7	GREEN RIVER						
OULT AN A PACE DACEN							COUGAR MTN. PILL	OW 3200	6/01/89		.0s	.0	.0
CHELAN LAKE BASIN							STAMPEDE PASS PILL		6/01/89		20.15		30,6
LYMAN LAKE PILLO	w 5900	6/01/89		29.55	48.5	47.6							
MINERS RIDGE PILLOW	6 200	6/01/89		39.38			SNOHOMISH RIVER						
PARK CK RIDGE PILLO		6/01/89		7.1S	.0	10.8		2.22	6 /3 / /6 /		2 -		
RAINY PASS PILLO	W 4780	6/01/89		23.55	20.2	26.4	KROMONA MINE	2400	5/31/89	4	2.5	2.4	
							MIOOLE SULTAN OLNEY PASS	3010 3250	5/31/89 5/31/89	0	.0	.0	
MENATCHEE RIVER							STEVENS PASS PILL		6/01/89		1.95	3.1	27.5
by Friday Discours	4270	6/01/00		0	.0	.0	STICKNEY RIOGE	3640	5/31/89	78	44.3	34.1	2/.5
BLEWETT PASS#2PILLO		6/01/89 6/01/89		.0 29.55	48.5	47.6	STICKHET KIGGE	3040	3/ 31/03	70	44.5	34.1	
LYMAN LAKE PILLO		6/01/89		1.95	3.1	27.5	SKAGIT RIVER						
STEVENS PASS PILLO STEVENS PASS SANO S		6/01/89	0	.0	1.4	11.3							
SIEVENS PASS SANO S	3700	0/01/09	U	.0	1.4		HARTS PASS PILL	OW 6500	6/01/89		29.15	17.0	35.7
COLOCKUM CREEK							LYMAN LAKE PILL	OW 5900	6/01/89		29.5S	48.5	47.6
		- 4 4					RAINY PASS PILL	OW 4780	6/01/89		23.55	20.2	26.4
TROUGH #2 PILLO	W 5310	6/01/89		.0s	.0	~~							





The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

Canada:

Ministry of the Environment, Water

Investigations Branch, Victoria, British Columbia

States:

Washington State Department of Ecology

Washington State Department of Natural Resources

Federal:

Department of the Army

Corps of Engineers

U.S. Department of Agriculture

Forest Service

U.S. Department of Commerce

NOAA, National Weather Service

U.S. Department of the Interior

Bonneville Power Administration

Bureau of Reclamation

Geological Survey

National Park Service

Bureau of Indian Affairs

Local:

City of Tacoma

City of Seattle

Chelan County P.U.D.

Pacific Power and Light Company

Puget Sound Power and Light Company Washington Water Power Company

Snohomish County P.U.D.

Colville Confederated Tribes

Spokane County

Private:

Okanogan Irrigation District

Wenatchee Heights Irrigation District

Newman Lake Homeowners Association

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ROOM 360, U.S. COURT HOUSE SPOKANE, WASHINGTON 99201

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Washington **Water Supply Outlook**

Federal — State — Private Cooperative Snow Surveys



